JSIP: Jurnal Studi Ilmu Pemerintahan
Volume 6, No 2, 2025
ISSN: 2722-7405

Public Sector Facilities Maintenance and Organizational Efficiency: Evidence from InfraNodus-Based Analysis in Local Government

Nur Rini Abdullah*[1], Gita Susanti[1], and Muh Tang Abdullah[1]

[1]*Department of Public Administration, Universitas Hasanuddin, Indonesia*

**Email Co-Authors:* nurriniabdullah010@gmail.com

Article Info

Keyword:
Public Management, Asset Governance, Service Efficiency, Institutional Capacity, Urban Infrastructure.

Abstract: This study aims to examine the management of office facilities maintenance and its role in improving organizational performance efficiency in the Makassar City Public Works Department. The study adopts a qualitative descriptive approach to explore maintenance management practices within a local government context. Data were collected through observation, in-depth interviews, and documentation analysis, and further analyzed using qualitative content analysis and InfraNodus-based keyword network mapping. The findings indicate that maintenance management remains predominantly operational and reactive, with strong reliance on corrective actions rather than preventive strategies. Results show that maintenance practices are largely driven by public service demands and urban operational pressures, while strategic dimensions such as capacity building, performance competence, and systematic planning receive limited attention. The study highlights a structural gap between maintenance practices and organizational performance frameworks. Findings suggest that integrating maintenance management into strategic planning and adopting data-driven approaches are essential to enhance efficiency. Practically, this means that local government institutions need to strengthen preventive maintenance systems, improve coordination mechanisms, and utilize digital tools for monitoring and planning. This study is among the first to apply keyword network analysis to examine maintenance management discourse in a local government context, offering a novel perspective on linking maintenance practices with organizational performance efficiency.

Article History:
Received: March 10, 2025
Revised: June 19, 2025
Accepted: August 25, 2025

DOI: https://doi.org/10.35326/jsip.v6i2.8009

INTRODUCTION

Public sector organizations are increasingly required to demonstrate high levels of efficiency, accountability, and service quality in delivering public services (Coupet & Ba, 2025; Overman & Schillemans, 2022; Selepe, 2022). In this context, facilities maintenance management has become a critical supporting function that directly influences organizational performance. Office facilities, as a core component of public infrastructure, are expected to provide a conducive working environment that enables employees to perform their duties effectively (Ngcobo & Mhlanga, 2022; Ramantswana et al., 2024). However, despite its strategic importance, facilities maintenance in the public sector is often positioned as a secondary operational function rather than an integral part of organizational strategy (Pati et al., 2010; Simpeh et al., 2023). This condition creates a gap between intended performance outcomes and operational realities, particularly in local government institutions where resource constraints and bureaucratic complexity are prevalent.

Facilities maintenance management is generally defined as a set of technical and administrative processes aimed at preserving the functionality, safety, and usability of physical assets over time (Fraser, 2014; Shohet et al., 2025). Previous studies emphasize that maintenance activities should not only be reactive but also preventive and strategic, integrating long-term planning, performance measurement, and resource optimization (Velmurugan & Dhingra, 2021b; Yazdi, 2024). In practice, however, many public organizations still rely heavily on corrective maintenance approaches, which are triggered only after failures occur (Abu-Samra et al., 2020; Che-Ani & Ali, 2019). This reactive orientation often leads to higher costs, service disruptions, and shorter asset lifespans. Empirical evidence shows that inadequate maintenance practices are closely associated with inefficiencies in organizational operations (Kareem et al., 2019), including delays in service delivery, increased operational risks, and declining employee productivity.

The importance of maintenance management becomes even more pronounced in technically intensive institutions such as the Public Works Department in Indonesia (Nanang et al., 2023; Sumaryana et al., 2024). Within the Makassar City Public Works Department, office facilities serve not only administrative functions but also support complex technical operations that require reliability, coordination, and continuity (Akib et al., 2022). The availability of well-maintained facilities is therefore essential to ensure that technical personnel can perform tasks efficiently and without interruption. However, the Makassar City Public Works Department's office facilities indicate that the current maintenance management system has not been fully optimized (Akib et al., 2022). Issues such as delayed response to facility damage, lack of routine preventive maintenance, and suboptimal asset utilization continue to emerge as recurring challenges.

These conditions suggest that maintenance management practices within the organization remain dominated by short-term, problem-solving approaches rather than by systematic, strategic planning. The persistence of such practices reflects broader structural and managerial constraints, including limited budget allocation, absence of standardized maintenance policies, inadequate monitoring systems, and low institutional awareness of maintenance importance. Furthermore, the lack of integration between maintenance planning and organizational performance indicators makes it difficult to assess the true impact of maintenance activities on efficiency outcomes (Drożyner, 2020; Lundgren et al., 2020; Olan et al., 2022; Oliveira & Lopes, 2020). As a result, maintenance management remains fragmented and insufficiently aligned with organizational goals.

From a conceptual perspective, integrating maintenance management into organizational strategy requires shifting from an operational mindset to a strategic, performance-oriented approach (Gomes et al., 2021; Oliveira & Lopes, 2020; Velmurugan & Dhingra, 2021a). This includes adopting data-driven decision-making, implementing preventive and predictive maintenance systems, and aligning maintenance objectives with broader organizational performance metrics. In addition, stakeholder coordination among management, technical staff, and end-users is crucial to ensuring the effectiveness of maintenance practices. Studies on public sector facilities management highlight that communication, governance structures, sustainability considerations, and technological

adaptation are key factors shaping strategic maintenance outcomes (Desbalo et al., 2024; Lebea et al., 2024).

Empirically, identifying patterns in maintenance practices and the factors that influence them requires a comprehensive analytical approach that combines qualitative and quantitative perspectives (Naji et al., 2020; Sidhu et al., 2022). The use of keyword network analysis and thematic structure mapping provides an opportunity to explore how maintenance management is conceptualized and operationalized within the organization (Roda & Macchi, 2021). At the same time, examining operational characteristics and practice patterns enables a deeper understanding of how maintenance activities are implemented in real-world settings. This dual approach allows for the identification of both structural issues and practical constraints that affect maintenance performance, thereby providing a more holistic view of the problem.

Based on the above considerations, this study aims to analyze the management of office facilities maintenance in the Makassar City Public Works Department and its implications for organizational performance efficiency. The study seeks to bridge the gap between theoretical perspectives on strategic facilities management and empirical realities in local government contexts. By integrating conceptual analysis with evidence-based findings, this research is expected to contribute to the development of more efficient, structured, and performance-oriented maintenance management systems in the public sector. Accordingly, the research is guided by the following questions:

RQ1. How is Keyword Network and the Thematic Structure of Makassar City Public Works Department Maintenance Management?

RQ2. What factors influence the maintenance management of the Makassar City Public Works Department?

RQ3. What are the maintenance practice patterns and operational characteristics of the Makassar City Public Works Department?

RQ4. What are the implications for the performance efficiency of local government organizations?

RESEARCH METHOD

Research Design and Approach

This study adopts a qualitative, descriptive research design (Doyle et al., 2020; Moser & Korstjens, 2018), to explore the management of office facility maintenance and its implications for organizational performance efficiency within a local government context. A qualitative approach is appropriate because it enables an in-depth understanding of complex organizational practices (Işık & Zilka, 2025), particularly maintenance management processes, decision-making dynamics, and institutional constraints. Rather than focusing on numerical measurement, this study emphasizes the interpretation of meanings, perceptions, and experiences of key actors involved in facilities maintenance. This approach aligns with prior research that highlights the importance of practitioner perspectives in understanding strategic and operational practices in public sector management. The descriptive nature of the study enables a systematic portrayal of existing maintenance practices, including how maintenance

activities are planned, implemented, and evaluated within the organization. Furthermore, the research seeks to identify patterns, gaps, and inefficiencies in current practices, thereby providing a comprehensive overview of the maintenance management system. By combining observational insights with narrative data, the study captures both the formal structure and the practical realities of maintenance management in the Public Works Department of Makassar City.

Data Collection and Informant Selection

Data collection in this study is conducted through multiple qualitative techniques, including observation, in-depth interviews, and documentation analysis (Xu et al., 2024). The use of these complementary methods ensures data triangulation, thereby enhancing the credibility and validity of the findings. Observations are carried out to directly examine the physical condition of office facilities, maintenance activities, and the operational environment in which employees perform their tasks. This enables the researcher to identify discrepancies between reported practices and actual conditions. In-depth interviews are conducted to capture informants' perceptions, experiences, and insights on maintenance management practices, challenges, and institutional processes (Naji et al., 2020).

The study utilizes both primary and secondary data sources. Primary data are collected through interviews and field observations, while secondary data are obtained from institutional documents, maintenance records, and relevant literature. Informant selection is conducted using purposive sampling, focusing on individuals with direct knowledge and involvement in facility maintenance management. A total of seven informants is included in this study: five staff members from the Public Works Department of Makassar City, one Head of the General and Personnel Subdivision, and one Head of the Correspondence Administration Section. These informants are selected based on their roles, responsibilities, and relevance to the research objectives, ensuring that the data obtained are both accurate and contextually rich. This approach is consistent with qualitative research practices that prioritize depth of information over sample size.

Data Analysis Using InfraNodus

The data analysis process in this study follows a systematic, iterative approach that combines qualitative content analysis with network-based text analysis using InfraNodus (Lawelai et al., 2025). Initially, all interview data are transcribed and organized to facilitate coding and thematic identification. The researcher conducts a preliminary analysis by categorizing responses into key themes: maintenance practices, organizational challenges, resource constraints, and performance implications. Following this, the transcribed interview data are processed using InfraNodus, a text network analysis tool that enables the identification of patterns, relationships, and key discourse structures within qualitative data. InfraNodus transforms textual data into a network graph, where words and concepts are represented as nodes and their co-occurrences as connections (Lestaluhu & Lawelai, 2024; Paranyushkin, 2019; Tursunkulova et al., 2023). This method allows for the detection of central themes,

bridging concepts, and structural gaps in the discourse. By analyzing the network structure, the study can identify dominant topics and hidden connections among issues such as maintenance inefficiency, resource allocation, and organizational performance. This approach provides a more nuanced understanding of how different factors interact within the maintenance management system. The integration of InfraNodus analysis enhances the rigor of qualitative interpretation by offering both visual and analytical insights into the data structure. The results of the analysis are then interpreted in relation to existing theoretical frameworks and empirical findings, ensuring that conclusions are grounded in both data-driven evidence and scholarly perspectives.

RESULTS AND DISCUSSION

Keyword Network and Thematic Structure of Maintenance Management

The findings revealed that the qualitative interview data analyzed using InfraNodus produced a structured keyword co-occurrence network, as presented in Figure 1. The network visualization indicated that the discourse surrounding maintenance management in the Public Works Department of Makassar City is strongly dominated by interconnected clusters related to public services, urban maintenance, and organizational processes. The network graph demonstrated that central nodes such as “public,” “service,” “maintenance,” “city,” and “system” appeared with high frequency and connectivity, indicating their dominant role in shaping the overall discourse. These central nodes functioned as bridging concepts linking multiple thematic clusters, suggesting that maintenance management is closely embedded within broader public service delivery mechanisms rather than being treated as an isolated technical function.

The result indicated that the structure of the network is relatively dense in the main clusters but fragmented in peripheral topics. This condition reflects that the organization has a strong operational focus but lacks integration in supporting aspects such as capacity building, partnerships, and performance competence (Bowersox et al., 2021; Saputra et al., 2024). The visualization in Figure 1 also showed that connections between maintenance-related terms and performance-related terms are present but relatively weak, indicating that maintenance activities are not yet fully linked to measurable performance outcomes. This pattern suggests that maintenance management is still perceived as a supporting function rather than a strategic driver of organizational efficiency (Gomes et al., 2021; Velmurugan & Dhingra, 2021a).

Furthermore, the findings revealed that the network exhibits a centralization tendency, where a limited number of keywords dominate the discourse. This indicates a concentration of attention on operational issues such as facility condition, maintenance activities, and service delivery. However, the absence of strong links to strategic concepts such as planning, evaluation, and performance measurement suggests that maintenance practices are not yet systematically aligned with organizational performance frameworks. The result supports previous empirical findings that maintenance management in public sector organizations tends to be operationally driven and lacks strategic integration (Garengo & Sardi, 2021; Nanang et al., 2023; Ochieng & Ominde, 2020; Ogunbayo et al., 2020).

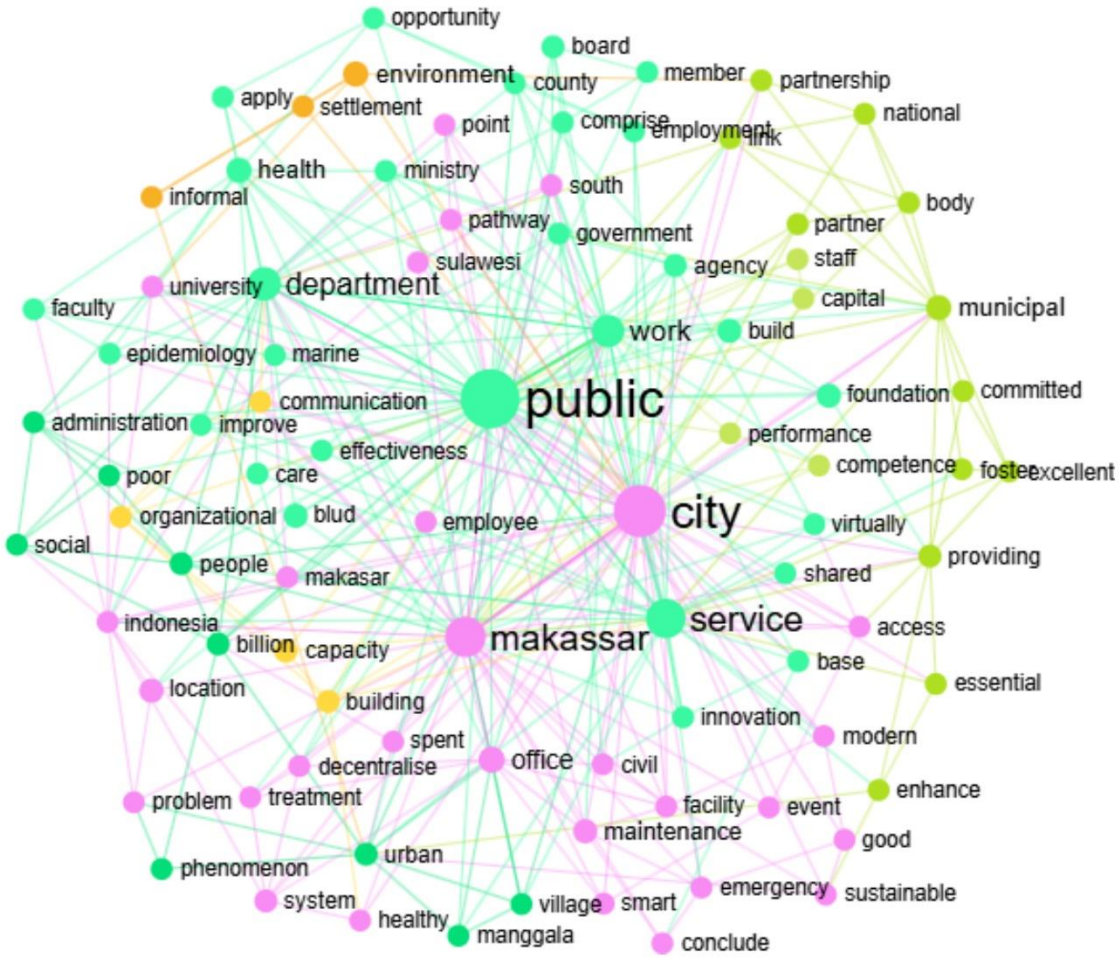

Figure 1. Keyword Co-occurrence Network from Qualitative Interview Analysis
Source: Author-generated through InfraNodus

The analysis also identified structural gaps within the network, particularly in areas related to organizational capacity and performance competence. These gaps indicate potential areas where the organization lacks discourse and, consequently, lacks operational focus. For instance, keywords related to "capacity," "communication," and "competence" appeared in smaller clusters with limited connections, suggesting that human resource development and institutional strengthening are not yet prioritized in maintenance management practices. This finding highlights the need for strengthening internal capacity to improve maintenance efficiency and organizational performance outcomes.

Factors Influencing Maintenance Management

The results presented in Table 1 showed that the dominant factors influencing maintenance management are categorized into seven major clusters, with varying levels of influence. The findings revealed that the top-ranked category was Public Services, accounting for 52% of the total influence, followed by Urban Maintenance at 38%. These two categories collectively represent 90% of the total discourse, indicating that maintenance management is primarily driven by service delivery demands and urban operational challenges.

Table 1. Topic Groups Qualitative Interview Analysis

Category and Topical Cluster	Influence	Total Nodes	Keywords
1. Public Services	52%	28	public, service, department, work, health, board, agency, comprise, opportunity, blud, build, foundation, innovation, marine, apply, employment, ministry, shared, virtually, faculty, epidemiology, care, improve, government, effectiveness, base, member, county
2. Urban Maintenance	38%	29	city, makassar, office, maintenance, system, decentralise, good, emergency, location, treatment, modern, civil, sulawesi, spent, sustainable, point, pathway, healthy, access, event, smart, makasar, problem, indonesia, university, employee, conclude, facility, south
3. Municipal Partnerships	3%	12	municipal, providing, excellent, body, national, link, partner, partnership, foster, committed, enhance, essential
4. Social Phenomena	2%	9	people, urban, billion, social, phenomenon, poor, administration, village, manggala
5. Informal Environments	2%	3	environment, settlement, informal
6. Capacity Building	1%	4	capacity, building, organizational, communication
7. Performance Competence	1%	4	performance, capital, competence, staff

Source: Author-generated through InfraNodus

The result indicated that the Public Services category contains the highest number of influential keywords, including “public,” “service,” “department,” “government,” and “effectiveness.” This suggests that maintenance activities are closely tied to the organization’s responsibility to deliver public services. The dominance of this category indicates that maintenance decisions are largely influenced by service requirements rather than preventive planning or asset management strategies (Hinrichs et al., 2024; Zeb, 2022). This finding reflects a service-oriented approach where maintenance is performed to sustain operational continuity rather than to optimize long-term asset performance.

The second-ranked category, Urban Maintenance (38%), includes keywords such as “city,” “maintenance,” “office,” “system,” and “facility.” The findings revealed that this category represents the technical and operational aspects of maintenance management. The high influence of this category indicates that the organization places significant emphasis on managing physical infrastructure and responding to urban operational demands. However, the result also indicated that the presence of terms such as “emergency,” “problem,” and “repair” suggests a reactive maintenance approach. This

implies that maintenance activities are frequently triggered by failures rather than being planned systematically.

The findings also revealed that lower-ranked categories such as Municipal Partnerships (3%), Social Phenomena (2%), Informal Environments (2%), Capacity Building (1%), and Performance Competence (1%) have minimal influence. The low ranking of these categories indicates that strategic collaboration, social context, and organizational capacity are not central considerations in current maintenance practices. Particularly, the low influence of Capacity Building and Performance Competence suggests that there is limited focus on improving staff skills and linking maintenance activities to performance outcomes (Akdere & Egan, 2020). This imbalance indicates a gap between operational practices and strategic management objectives.

Moreover, the result indicated that the distribution of influence across categories is highly uneven, with a strong concentration in operational domains. This suggests that maintenance management lacks a holistic approach that integrates technical, organizational, and strategic dimensions (Introna & Santolamazza, 2024). The dominance of operational factors over strategic factors highlights the need for reorienting maintenance practices toward a more balanced and integrated framework.

Maintenance Practice Patterns and Operational Characteristics

The findings revealed that maintenance management practices in the Public Works Department of Makassar City are predominantly operational and reactive in nature. The analysis of interview data indicated that maintenance activities are largely driven by immediate needs, such as repairing damaged facilities and addressing service disruptions. This pattern is consistent with the high frequency of keywords related to “emergency,” “problem,” and “repair” identified in the Urban Maintenance cluster. The result indicated that preventive maintenance practices are not consistently implemented, leading to a cycle of recurring defects and increased maintenance workload.

The findings also showed that asset utilization is not fully optimized. Keywords such as “facility,” “office,” and “system” appeared frequently, indicating that infrastructure plays a central role in organizational operations. However, the absence of strong connections with keywords related to “planning,” “monitoring,” and “evaluation” suggests that asset management processes are not systematically structured (Katina et al., 2021). This condition results in inefficient use of resources and limited ability to anticipate maintenance needs. Consequently, maintenance activities tend to focus on short-term solutions rather than long-term efficiency.

The result indicated that organizational coordination in maintenance management is present but not fully integrated. Keywords such as “department,” “agency,” and “government” suggest the involvement of multiple organizational units. However, the network analysis showed weak connections between these units, indicating limited coordination and communication. This lack of integration may lead to duplication of efforts, delays in decision-making, and inefficiencies in maintenance operations. The findings highlight the importance of strengthening coordination mechanisms to improve maintenance effectiveness.

Furthermore, the findings revealed that human resource factors play a limited role in current maintenance practices. The low influence of keywords related to "capacity," "competence," and "communication" suggests that staff development and training are not prioritized. This condition may affect the quality of maintenance work and the ability of the organization to adopt more advanced maintenance strategies. The result indicates that improving human resource capacity is essential for enhancing maintenance performance and organizational efficiency.

The findings also showed that digitalization and modern maintenance systems are not yet fully utilized. Although keywords such as "system" and "modern" appear in the network, their connections are relatively weak, indicating limited implementation. This suggests that maintenance processes are still largely manual and lack technological support (Turner et al., 2019). The absence of digital monitoring systems may contribute to delays in identifying defects and inefficiencies in maintenance scheduling.

Implications for Organizational Performance Efficiency

The findings revealed that maintenance management practices have a direct impact on organizational performance efficiency. The dominance of operational and reactive maintenance practices indicates that a significant portion of organizational resources is allocated to addressing immediate issues rather than improving efficiency. The result indicated that delays in maintenance activities can disrupt workflow, reduce employee productivity, and affect service delivery outcomes. This condition is reflected in the strong presence of keywords related to "work," "employee," and "service," which are closely linked to maintenance-related terms in the network.

The analysis also showed that inefficient maintenance practices contribute to increased operational costs. The frequent occurrence of repair-related activities suggests that the organization incurs higher costs due to repeated maintenance interventions (Sarker & Faiz, 2016). This pattern indicates that the lack of preventive maintenance leads to higher long-term expenses, reducing overall efficiency. The findings support the argument that shifting from corrective to preventive maintenance can significantly improve cost efficiency and asset performance.

Moreover, the findings revealed that organizational performance is influenced by the level of integration between maintenance management and service delivery processes. The strong linkage between Public Services and Urban Maintenance clusters indicates that maintenance plays a critical role in supporting organizational functions. However, the weak connection with Performance Competence suggests that the organization has not yet established clear performance indicators related to maintenance activities (Lundgren et al., 2021). This gap limits the ability to evaluate the effectiveness of maintenance management and its contribution to organizational outcomes.

The result indicated that improving maintenance management requires a comprehensive approach that integrates operational, strategic, and organizational dimensions. Strengthening preventive maintenance practices, enhancing coordination among units, and improving staff capacity are identified as key areas for improvement. Additionally, the adoption of digital maintenance systems can enhance monitoring,

planning, and decision-making processes. These measures are expected to improve maintenance efficiency and, consequently, organizational performance.

Finally, the findings revealed that maintenance management has the potential to become a strategic driver of organizational efficiency if properly managed. By aligning maintenance practices with organizational goals, improving resource allocation, and strengthening institutional capacity, the Public Works Department of Makassar City can enhance its performance and service delivery outcomes. The results highlight the importance of transforming maintenance management from a reactive operational function into a proactive and strategic component of organizational management.

CONCLUSION

This study demonstrates that the management of office facilities maintenance in the Makassar City Public Works Department remains predominantly operational and reactive, rather than strategic and performance-oriented. The findings indicate that maintenance practices are strongly influenced by immediate service demands and urban operational pressures, as reflected in the dominance of public service and urban maintenance clusters within the keyword network structure. This investigation highlights that maintenance management is still positioned as a supporting function, with limited integration into broader organizational performance frameworks. The weak connections between maintenance-related discourse and performance-oriented concepts suggest that maintenance activities are not yet systematically aligned with efficiency objectives. This implies that the organization continues to operate within a short-term problem-solving paradigm, where maintenance interventions are triggered by failures rather than guided by preventive planning and strategic asset management. These findings suggest that the absence of structured planning, monitoring, and evaluation mechanisms contributes to fragmented maintenance practices and limits the organization's ability to optimize resource utilization and improve operational efficiency.

Furthermore, the study demonstrates that several structural and organizational factors significantly influence maintenance management practices, including budget constraints, limited institutional capacity, weak coordination mechanisms, and low prioritization of performance competence. The findings indicate that categories such as capacity building and performance competence have minimal influence within the discourse, reflecting a lack of emphasis on human resource development and strategic alignment. This investigation highlights the imbalance between operational focus and strategic orientation, where technical and service-related aspects dominate while organizational development dimensions remain underdeveloped. This implies that improving maintenance management requires not only technical adjustments but also institutional transformation that strengthens governance structures, enhances communication, and promotes data-driven decision-making. These findings suggest that the integration of maintenance management into organizational strategy is essential to achieving sustainable efficiency improvements. Practically, this means that local government institutions need to shift toward preventive and predictive maintenance approaches, develop standardized maintenance policies, and implement digital monitoring systems to enhance planning and coordination processes.

Finally, this study demonstrates that maintenance management has a significant impact on organizational performance efficiency, particularly in terms of productivity, cost control, and service delivery continuity. The findings indicate that inefficient maintenance practices contribute to delays, increased operational costs, and reduced employee performance, thereby limiting the overall effectiveness of the organization. This investigation highlights that maintenance management holds the potential to function as a strategic driver of efficiency if it is properly aligned with organizational objectives and supported by adequate resources and institutional capacity. This implies that transforming maintenance management from a reactive operational activity into a proactive and integrated system is critical for improving local government performance. These findings suggest that future efforts should focus on strengthening the linkage between maintenance activities and performance indicators, as well as enhancing cross-functional coordination within the organization. Future research should explore comparative studies across different local government institutions to identify contextual variations and best practices, as well as examine the role of digital technologies and advanced maintenance systems in improving efficiency outcomes in the public sector.

REFERENCES

Abu-Samra, S., Ahmed, M., & Amador, L. (2020). Asset Management Framework for Integrated Municipal Infrastructure. *Journal of Infrastructure Systems*, *26*(4). https://doi.org/10.1061/(asce)is.1943-555x.0000580

Akdere, M., & Egan, T. (2020). Transformational leadership and human resource development: Linking employee learning, job satisfaction, and organizational performance. *Human Resource Development Quarterly*, *31*(4), 393–421. https://doi.org/10.1002/hrdq.21404

Akib, H., Abdullah, N. R., Niswaty, R., Arhas, S. H., & Awaluddin, M. (2022). Maintenance of Office Facilities at the Makassar City Public Works Service. *Jurnal Ilmiah Ilmu Administrasi Publik*, *12*(1), 69. https://doi.org/10.26858/jiap.v12i1.32767

Bowersox, N. W., Williams, V., Kawentel, L., & Kilbourne, A. M. (2021). Sustaining effective research/operational collaborations: Lessons learned from a National Partnered Evaluation Initiative. *Healthcare*, *9*(4), 100588. https://doi.org/10.1016/j.hjdsi.2021.100588

Che-Ani, A. I., & Ali, R. (2019). Facility management demand theory: Impact of proactive maintenance on corrective maintenance. *Journal of Facilities Management*, *17*(4), 344–355. https://doi.org/10.1108/JFM-09-2018-0057

Coupet, J., & Ba, Y. (2025). Efficient at What? The Independence of Efficiency Measures in Public Transit. *State and Local Government Review*. https://doi.org/10.1177/0160323X251377373

Desbalo, M. T., Woldesenbet, A. K., Bargstädt, H. J., & Yehualaw, M. D. (2024). Critical factors that influence the effectiveness of facility maintenance management practice in public university buildings in Ethiopia: an exploratory factor analysis. *Cogent Engineering*, *11*(1), 2307150. https://doi.org/10.1080/23311916.2024.2307150

Doyle, L., McCabe, C., Keogh, B., Brady, A., & McCann, M. (2020). An overview of the qualitative descriptive design within nursing research. *Journal of Research in Nursing*, *25*(5), 443–455. https://doi.org/10.1177/1744987119880234

Drożyner, P. (2020). The impact of the implementation of management system on the

perception of role and tasks of maintenance services and effectiveness of their functioning. *Journal of Quality in Maintenance Engineering*, *27*(2), 430–450. https://doi.org/10.1108/JQME-09-2019-0089

Fraser, K. (2014). Facilities management: the strategic selection of a maintenance system. *Journal of Facilities Management*, *12*(1), 18–37. https://doi.org/10.1108/JFM-02-2013-0010

Garengo, P., & Sardi, A. (2021). Performance measurement and management in the public sector: state of the art and research opportunities. *International Journal of Productivity and Performance Management*, *70*(7), 1629–1654. https://doi.org/10.1108/IJPPM-03-2020-0102

Gomes, C. F., Yasin, M. M., & Simões, J. M. (2021). The emerging organizational role of the maintenance function: a strategic perspective. *Journal of Quality in Maintenance Engineering*, *27*(1), 144–168. https://doi.org/10.1108/JQME-03-2017-0012

Hinrichs, M., Prifti, L., & Schneegass, S. (2024). Data-driven decision-making in maintenance management and coordination throughout the asset life cycle: an empirical study. *Journal of Quality in Maintenance Engineering*, *30*(1), 202–220. https://doi.org/10.1108/JQME-04-2023-0038

Introna, V., & Santolamazza, A. (2024). Strategic maintenance planning in the digital era: a hybrid approach merging Reliability-Centered Maintenance with digitalization opportunities. *Operations Management Research*, *17*(4), 1397–1420. https://doi.org/10.1007/s12063-024-00496-y

Işık, B., & Zilka, M. (2025). Maintenance Management in Production: A Qualitative Study on Industry 4.0 Adoption and Challenges. *Procedia Computer Science*, *253*, 2478–2487. https://doi.org/10.1016/j.procs.2025.01.308

Kareem, J. A. H., Saeed, K. F. A., & Faraj, O. M. M. (2019). Maintenance Practices in Poor Uptime of Operating Equipment Toward Dynamic of Business Issues. *International Journal of Innovation and Technology Management*, *16*(2). https://doi.org/10.1142/S0219877019500172

Katina, P. F., Pyne, J. C., Keating, C. B., & Komljenovic, D. (2021). Complex System Governance as a Framework for Asset Management. *Sustainability*, *13*(15), 8502. https://doi.org/10.3390/su13158502

Lawelai, H., Nurmandi, A., Maulana, H. F., & Jubba, H. (2025). InfraNodus analysis of text, networks, and sentiment on a political actor across media platforms. *Jurnal Komunikasi*, *19*(3), 491. https://journal.uii.ac.id/jurnal-komunikasi/article/download/37256/19110/153812

Lebea, M. J., Agumba, J. N., & Adebowale, O. J. (2024). Critical success factors in the maintenance strategies of public healthcare facilities. *International Journal of Building Pathology and Adaptation*, *42*(7), 55–75. https://doi.org/10.1108/IJBPA-02-2024-0038

Lestaluhu, M., & Lawelai, H. (2024). The Interconnected Factors of Migrant Land Issues for Sustainable Urban Development. *Jurnal Ranah Publik Indonesia Kontemporer (Rapik)*, *4*(1), 49–59. https://doi.org/10.47134/rapik.v4i1.69

Lundgren, C., Bokrantz, J., & Skoogh, A. (2020). Performance indicators for measuring the effects of Smart Maintenance. *International Journal of Productivity and Performance Management*, *70*(6), 1291–1316. https://doi.org/10.1108/IJPPM-03-2019-0129

Lundgren, C., Bokrantz, J., & Skoogh, A. (2021). Performance indicators for measuring the effects of Smart Maintenance. *International Journal of Productivity and Performance Management*, *70*(6), 1291–1316. https://doi.org/10.1108/IJPPM-

03-2019-0129

Moser, A., & Korstjens, I. (2018). Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis. *European Journal of General Practice*, *24*(1), 9–18. https://doi.org/10.1080/13814788.2017.1375091

Naji, A., EL Oumami, M., Bouksour, O., & Beidouri, Z. (2020). A mixed methods research toward a framework of a maintenance management model: A survey in Moroccan industries. *Journal of Quality in Maintenance Engineering*, *26*(2), 260–289. https://doi.org/10.1108/JQME-10-2018-0079

Nanang, R., Susilawati, C., & Skitmore, M. (2023). Toward a public sector asset optimization strategy: the case of Indonesia. *Construction Innovation*, *23*(5), 1186–1209. https://doi.org/10.1108/CI-12-2021-0235

Ngcobo, S., & Mhlanga, J. S. (2022). University Administrative Employees' Perceptions of Their Offices' Physical Environment Comfort. *Business Ethics and Leadership*, *6*(4), 61–78. https://doi.org/10.21272/bel.6(4).61-78.2022

Ochieng, E., & Ominde, D. (2020). The Role of Operations and Maintenance in Infrastructure Management. In *Routledge Handbook of Planning and Management of Global Strategic Infrastructure Projects* (pp. 221–250). Routledge. https://doi.org/10.4324/9781003036388-10

Ogunbayo, B. F., Aigbavboa, C. O., Thwala, W. D., Akinradewo, O. I., & Edwards, D. (2020). Validating elements of organisational maintenance policy for maintenance management of public buildings in Nigeria. *Journal of Quality in Maintenance Engineering*, *29*(5), 16–36. https://doi.org/10.1108/JQME-05-2021-0039

Olan, F., Ogiemwonyi Arakpogun, E., Suklan, J., Nakpodia, F., Damij, N., & Jayawickrama, U. (2022). Artificial intelligence and knowledge sharing: Contributing factors to organizational performance. *Journal of Business Research*, *145*, 605–615. https://doi.org/10.1016/j.jbusres.2022.03.008

Oliveira, M. A., & Lopes, I. (2020). Evaluation and improvement of maintenance management performance using a maturity model. *International Journal of Productivity and Performance Management*, *69*(3), 559–581. https://doi.org/10.1108/IJPPM-07-2018-0247

Overman, S., & Schillemans, T. (2022). Toward a Public Administration Theory of Felt Accountability. *Public Administration Review*, *82*(1), 12–22. https://doi.org/10.1111/puar.13417

Paranyushkin, D. (2019). InfraNodus: Generating insight using text network analysis. *The Web Conference 2019 - Proceedings of the World Wide Web Conference, WWW 2019*, 3584–3589. https://doi.org/10.1145/3308558.3314123

Pati, D., Park, C.-S., & Augenbroe, G. (2010). Facility Maintenance Performance Perspective to Target Strategic Organizational Objectives. *Journal of Performance of Constructed Facilities*, *24*(2), 180–187. https://doi.org/10.1061/(asce)cf.1943-5509.0000070

Ramantswana, T., Mmamabolo, L. B., & Appel-Meulenbroek, R. (2024). Open-plan office employees' perceived mental and social well-being. *Journal of Corporate Real Estate*, *26*(3), 262–277. https://doi.org/10.1108/JCRE-10-2023-0042

Roda, I., & Macchi, M. (2021). Maintenance concepts evolution: a comparative review towards Advanced Maintenance conceptualization. *Computers in Industry*, *133*, 103531. https://doi.org/10.1016/j.compind.2021.103531

Saputra, N., Putera, R. E., Zetra, A., Azwar, Valentina, T. R., & Mulia, R. A. (2024). Capacity building for organizational performance: a systematic review, conceptual framework, and future research directions. *Cogent Business and Management*,

11(1), 2434966. https://doi.org/10.1080/23311975.2024.2434966

Sarker, B. R., & Faiz, T. I. (2016). Minimizing maintenance cost for offshore wind turbines following multi-level opportunistic preventive strategy. *Renewable Energy*, *85*, 104–113. https://doi.org/10.1016/j.renene.2015.06.030

Selepe, M. M. (2022). The Role of Public Administration on the Efficiency of Public Services. *African Renaissance*, *19*(1), 101–124. https://doi.org/10.31920/2516-5305/2022/19n1a5

Shohet, I. M., Levi, S., Zeibak-Shini, R., & Shahin, F. (2025). Performance-Based Maintenance and Operation of Multi-Campus Critical Infrastructure Facilities Using Supply Chain Multi-Choice Goal Programming. *Applied Sciences (Switzerland)*, *15*(20), 11161. https://doi.org/10.3390/app152011161

Sidhu, S. S., Singh, K., & Ahuja, I. S. (2022). An empirical investigation of maintenance practices for enhancing manufacturing performance in small and medium enterprises of northern India. *Journal of Science and Technology Policy Management*, *13*(1), 132–153. https://doi.org/10.1108/JSTPM-11-2019-0109

Simpeh, F., Mavangwa, G. M., & Wentzel, L. (2023). Strategies to overcome barriers to public facilities management. *Property Management*, *41*(3), 365–380. https://doi.org/10.1108/PM-03-2022-0016

Sumaryana, A., Komara, S. R., & Pancasilawan, R. (2024). Rethinking Local Government Asset Management in Indonesia: Governance, Planning, and Policy Evaluation. *Journal of Contemporary Governance and Public Policy*, *5*(2), 217–232. https://doi.org/10.46507/jcgpp.v5i2.643

Turner, C. J., Emmanouilidis, C., Tomiyama, T., Tiwari, A., & Roy, R. (2019). Intelligent decision support for maintenance: an overview and future trends. *International Journal of Computer Integrated Manufacturing*, *32*(10), 936–959. https://doi.org/10.1080/0951192X.2019.1667033

Tursunkulova, I., de Castell, S., & Jenson, J. (2023). Exploring Infranodus: a Text Analysis Tool. *20th International Conference on Cognition and Exploratory Learning in Digital Age, CELDA 2023*, 34–42. https://eric.ed.gov/?id=ED636402

Velmurugan, R. S., & Dhingra, T. (2021a). Asset Maintenance Framework and Benchmarking. In *International Series in Operations Research and Management Science* (Vol. 310, pp. 83–112). Springer. https://doi.org/10.1007/978-3-030-74154-9_4

Velmurugan, R. S., & Dhingra, T. (2021b). Maintenance Strategy, Practices and Spare Parts Management. In *International Series in Operations Research and Management Science* (Vol. 310, pp. 61–82). Springer. https://doi.org/10.1007/978-3-030-74154-9_3

Xu, Z., Wang, Y., & Qian, Y. (2024). The Design and Application of In-depth Interview in Primary Care Research. *Chinese General Practice*, *27*(22), 2797–2806. https://doi.org/10.12114/j.issn.1007-9572.2022.0597

Yazdi, M. (2024). Maintenance Strategies and Optimization Techniques. In *Advances in computational mathematics for industrial system reliability and maintainability* (pp. 43–58). Springer. https://doi.org/10.1007/978-3-031-53514-7_3

Zeb, J. (2022). A level of service framework for service-centric asset management planning. *Built Environment Project and Asset Management*, *12*(2), 147–162. https://doi.org/10.1108/BEPAM-12-2020-0192